Mr. Balfour said he counted it a most happy and fortunate circumstance that he had been able to take any part whatsoever in an occasion which was interesting, not merely to Manchester or merely to Lancashire, but to the whole of a country which depended in an ever-increasing degree upon its power to preserve its position as a great manufacturing centre. The building was perhaps the greatest fruit of that kind of municipal enterprise in this country, and though he would be presumptuous in saying that the brief visit he had been able to pay to it had given him any adequate or sufficient idea of all that it was capable of doing for the industries of Lancashire, still nobody could go over the building, observe its equipment, study even in the most cursory manner the care which had been devoted to it, without feeling that the corporation had set a great example worthy of the place it held in Lancashire and in Great Britain.

The great building in which they were assembled was an outward and visible sign of that awakening which had come over our people in view of the ever-changing conditions of intellectual industry. There was a time when we could flatter ourselves without any undue egotism or vanity that not only were we the first of the industrial nations, but that the rest were nowhere. That time had passed never to return again, and he was far from uttering selfish complaints at that change in the condition of the world which was absolutely inevitable, and from which they ought not to be, and in his judgment would not be, the ultimate losers. It was a profound mistake to suppose that the fact that other nations were now great producing centres was an injury pure and simple to this country. It was nothing of the kind. The growth of the wealth of the world must be a benefit to every part of the world, and all that we had to do was to see that we bore our full share in the great industrial development.

But not only was there the change in the industrial condition of the world to which he had adverted, but another change had occurred more closely connected, perhaps, with the necessity for institutions of this character. It was the change from the pre-scientific to the scientific stage of industry. When England or Great Britain first obtained its great manufacturing monopoly, it was not too much to say that the relation between science and industry was of the feeblest character. There was always, of course, the closest connection between mechanical ingenuity and invention and the great growth of our industries, but the intimate correlation between the discoveries of the laboratory and the processes of the workshop was not in existence, and it was because we had been a little slow to discover in this country how intimately speculative research is connected with manufacturing progress that we were, in some branches of our work at all events, behind our neighbours, who in this respect, although not in many others, had proved themselves more ready and more apt to learn that lesson than we had ourselves. And if anybody wanted a proof of the truth of the proposition he was laying down they had only to recall the kind of meaning which the average man attached only a few years ago to the phrase "technical instruction." In the phrase "technical instruction" there was, in the minds of the people of whom he spoke, no scientific tinge or flavour whatever, but some kind of knowledge of manual dexterity, some opportunity for learning the uses of machinery, and so forth. But the fact on which he was venturing to insist, and on which the very existence and justification of an institution like that at Manchester depended, was that henceforth and evermore there would be a closer and closer connection between the most remote and abstract scientific study of the chemist, of the physicist, of the electrician in his laboratory, and the great industries of the community of which he was a member. He wished he could be quite sure that even now, and even in the more cultivated part of the community, there was a more perfect appreciation of two capital facts which he would like to impress upon all who heard him. One was that education was, and must be, an organic whole, and that it was perfectly vain to spend vast sums upon buildings and equipments unless the student who went to those places went adequately prepared to learn the lesson they could teach. He had not the slightest intention of over-exalting or over-praising foreign nations at the expense of our own, but it must be admitted that they had grasped much more fully and much more firmly the great truth on which he was insisting—namely, that a man really to profit by the scientific training which he could get in these institutions and to be able himself to turn the learning he acquired to the purpose of original discovery, it may be of original research of his own, had to go there, not a raw product, but at all events a half-prepared human product. He should go there, not only anxious to learn, but ready to learn.

Another great truth was that, after all, the persons who were responsible for the manufactures of the country were the manufacturers. It was perfectly vain and useless to turn out highly-trained and capable servants if there were not to be employers for them when they were turned out. He did not in the least know whether in Germany, for instance, they might not have overdone the matter; he had not sufficient evidence on the point, but he was quite sure something must be very wrong when he saw the extraordinary difference in the practice of the great German and in some, at all events, of the English firms. He was speaking on a subject which he only knew at second hand to people who knew the whole thing at first hand; but, unless his information greatly erred, they would find, if they went to Germany, at all events a few years ago, and studied the equipment of one of the great German industrial concerns, electrical, chemical, optical or what not, a proportion of scientifically trained students in the German manufactory enormously in excess of anything commonly thought necessary in this country. There was not the least use in the Manchester Corporation turning out competent students if those students were not to find employment when they were turned out. With the naturally conservative instincts of our nation, the tradition of the great manufacturing establishments would rather tend to make people say that the best, the only place in which to learn was not in the lecture-room, but in the shop, not at the feet of skilled professors, but actually among the artisans who were carrying on the industry, and he did not deny there was a great deal of truth in that, and that probably we gained a great deal by our extreme anxiety to make industrial training a practical training. But he felt confident that they drove that truth too far, and that, however sound the instinct might be which lay at the bottom of it, they were working it too hard at the present time, and that, if they really did mean to turn the brains, and the muscles, and the enterprise, and the energy, and the inventive skill of their countrymen to its best purpose, it was absolutely necessary to place among the directors of industry those who had not merely that admirable and necessary practical knowledge which consisted in seeing things done from day to day by the people who had to sell the article when it was finished, but, in addition, they must give that complete scientific training which had become more the basis of our whole industrial fabric.

He did not deny that there might be dangers in that course. Every policy they adopted required watching; every policy they adopted would petrify into some stupid and pedantic rules unless they kept close to the ever-varying realities of life, and if anybody said there might be a certain danger that they would have a *quasi*-scientific and industrial orthodoxy which would stand in the way of quick development in every new discovery in mechanics or in science, he did not deny that the danger might possibly exist. The way to meet it was to remember that true theory and true practice could never be divorced without loss to both, and that the ideal for which they had to strive was not that of simply imitating the processes of those who went before, but imitating their energy, their anxiety to take the best the world had to give—the world both of practice and of theory—in the changed and ever-changing conditions of our time. Let them imitate this great quality of their forefathers, and then institutions like that school would bear all the fruit of which they were capable. They would see the marriage of science and industry far more fertile and far more productive of good, and those who had called, and not called in vain, on Manchester for this great effort of municipal liberality might feel that their labours had not been thrown away, but that they had done great things for the growth, the maintenance and the expansion of those industries on which the health and existence of the community depended.

## NOTES.

THE office of Meteorological Reporter to the Government of India will become vacant in about a year by the retirement of Mr. J. Eliot, F.R.S., who has administered the office with great success for a long series of years. The selection of suitable names for consideration, with a view to the filling of the prospective vacancy after a preliminary period of training in Europe and in India, is now occupying the attention of an advisory committee of the Royal Society, nominated at the request of the Government of India. The problem of the future administration and scientific development of the department is also under consideration by the committee, in conjunction with Mr. Eliot, who is now in England for that purpose.

A BUREAU of Government Laboratories has been established in the Philippine Islands, and arrangements are being made for erecting a large building and equipping it with modern appliances for scientific work. Investigatious will be made, not only of the resources of the island, but also of tropical diseases. The laboratories will provide exceptional opportunities for scientific study in the tropics.

AT a meeting of the Cold Storage and Ice Association, to be held at the Institution of Mechanical Engineers on Wednesday, November 5, at 8 p.m., Dr. Carl Linde, of Munich, will read a paper on "The Technical Application of Liquid Air."

THE new session of the Hampstead Scientific Society will be inaugurated by a conversazione, to be held on Wednesday, October 29. Prof. Boyd Dawkins, F.R.S., will give an address on "The Forest Primeval of the Coal-measures."

THE meeting of the Geologists' Association on Friday, November 7, will be devoted to a conversazione at University College, Gower Street, W.C. Exhibits of specimens and photographs of geological interest will be on view during the evening.

AN Egyptian Medical Congress will be held at Cairo on December 19–23 under the presidency of Dr. Ibrahim Pacha Hassan. The principal object of the Congress is the study and discussion of diseases occurring in warm climates. The secretary of the English committee is Dr. W. Page May, 9 Manchester Square, London, W.

THE death is announced of Mr. Peter Brotherhood, whose invention of a new type of steam engine in 1872 made his name well known among mechanical engineers. In this type of engine, three cylinders are set at angles of 120° round a central chamber, and all three connecting rods operate upon one crank within the central chamber. Mr. Brotherhood introduced important improvements in the pumps for compressing air on board ship for use in torpedoes, and thus assisted the development of the automobile torpedo. He was also the inventor of a vertical direct-acting engine.

WITH reference to the movement which has been set on foot in Berlin to raise a fund to defray the cost of erecting a statue to the late Prof. Virchow in that city, the *British Medical Journal* states that Prof. Waldeyer, who has taken the lead in the matter, summoned a meeting for October 15. At an early date a committee will be formed in this country, with Lord Lister as chairman, to afford the friends and admirers of Virchow in the United Kingdom the opportunity of contributing to the memorial. The Berlin Medicinische Gesellschaft will hold a special memorial meeting for Virchow on October 29, and the Berlin Verein für innere Medizin has already held a special meeting in memory of Virchow and Gerhardt, when a memorial oration was deliverd by Prof. von Leyden.

THE Soufrière of St. Vincent was again in eruption on October 16. The following records are abridged from reports published in the *Times*:—*Kingstown, St. Vincent.*—The eruption has caused even greater distress in the colony than that which prevailed before. Large areas of tillage lands which were hitherto considered to be outside the volcanic zone are now buried in hot sand. The roads in the Windward district are the only regular means of communication between Georgetown and Kingstown, a distance of twenty miles, and travel is extremely difficult. *Barbados.*—Between 2 and 3 a.m. on October 16, loud reports heard from St. Vincent; at 7 a.m. inky blackness in direction of St. Vincent, air quite still; at 9.30 a.m., volcanic dust commenced falling, with very strong smell of sulphur. Dust continued to fall for several days, producing a deposit about one-eighth of an inch thick. *Windward Islands.*—Soufrière in full eruption October 16, between midnight and 5 a.m. No loss of life reported, but heavy fall of sand and stones, principally on Windward side as far as Union; slight fall Kingstown and Leeward coast. A layer of volcanic material eight inches deep was deposited in the Carib country. *Guadeloupe.*—Loud detonations were heard, and a glimmering light was seen in the direction of Martinique in the early morning.

WE have received from Mr. P. Baracchi, Government Astronomer, the results of observations in meteorology and terrestrial magnetism made at the Melbourne Observatory and other localities in the State of Victoria for the last half of the year 1901. These periodical results form a valuable contribution to the climatology of that part of Australia, showing in a concise form the monthly means and extremes at a considerable number of stations of the second and third orders, and the monthly and yearly rainfall of all the numerous stations in the State, together with the average rainfall computed from the results of as many years as are available for the purpose. In some cases the series exceeds forty years' duration.

WE learn from the *Auto-vélo* that Captain Ferber, of Nice, has recently made some highly successful experiments in aërial gliding. His first attempts were made with a machine of the Lilienthal type, with which several glides were effected, but this machine was destroyed by a sudden gust of wind, and Captain Ferber has now adopted a form of aëroplane similar to the two-surface machine of Mr. Wilber Wright and his brother, in which the operator assumes a horizontal position and steers by means of a rudder placed in front. The newspaper states that the captain is enchanted with his apparatus and hopes to beat the record of Mr. Wright of 150 metres. He finds the machine remarkably stable and easy of manipulation, and by careful management of the rudder he is able to land without any shock.

A SECOND edition of Dr. S. P. Langley's memoir containing the results of his "Experiments in Aërodynamics" has been published by the Smithsonian Institution. The work originally appeared eleven years ago, and the principles and experiments described in it have since been used in the construction of aërodromes or flying machines. At the end of his memoir, Dr. Langley refers to the position and promise of aërial navigation in the following words:—"Since the preceding lines were written, the writer has demonstrated that mechanical flight is possible by actually performing it with steel flying machines nearly a thousand times heavier than the air, driven by steam, and employing as a rule curved sustaining surfaces. These machines, which were built by the writer, weighed from thirty to forty pounds, and they have arisen and descended in safety, their flight being limited to distances of from half a mile to three-quarters of a mile, at speeds varying from twenty to thirty miles an hour (see NATURE, vol. liv. p. 80, May 28, 1896). The 'inchoate art' of aërodynamics has since made a corresponding progress, and while leaving a great deal to be done, it is believed by the writer that the time is now very near when human beings will be transported at high velocities, though perhaps at first under exceptional conditions such as are demanded in the arts of war rather than of peace."

VERY little ice has been reported from the north-western quarter of the North Atlantic this year. The Meteorological Office pilot chart for November shows that since the beginning of September a few large bergs have been passed on the steamer route between Belle Isle and the 50th meridian, but the strait of Belle Isle appears to have been quite free since about August 20, while no ice has been met with on the banks of Newfoundland for a long time past. For the month of September, 4300 observations of North Atlantic sea-surface temperatures were discussed, the results showing that nearly the whole of the area northward of the 48th parallel was warmer than the average, while between 30° and 48° N. there was a deficiency. In the immediate vicinity of the British coasts there was a slight defect, the air temperature over the land having been from 1° to 3° below the average. Further information relating to the West Indian volcanic eruptions is given, based on reports from captains of ships and on the preliminary report to the Royal Society by Drs. Anderson and Flett. At 2.30 a.m. on May 8, volcanic ash was falling on board the barque *Jupiter*, at a distance of 930 miles east-south-east (to windward) of St. Vincent, about twenty-four hours after the violent outburst from the Soufrière, so that the upper counter current had an average velocity of about forty miles an hour. Off Martinique, at 1.15 p.m. on August 21, the s.s. *Dahomé* was enveloped in a dust cloud from Mont Pelée, the darkness being more intense than that of night, while steam was rising from the sea in localities where the hot mud from the volcano fell into the water. Captain Leutken heard no noise or rumblings.

We have received from Messrs. Crompton and Co., Ltd., a pamphlet describing the latest pattern of Crompton potentiometer. The advantages possessed by this instrument for accurate measurements in direct-current work are well known. It can be used to measure either P.D., current, resistance or power; the actual measurement being in all cases made by balancing two potential differences. The instrument can be at any distance from the circuit under test, the lead wires introducing no error, since, when balance is obtained, no current flows through them. The form of instrument designed by Messrs. Crompton is very compact and convenient, and enables a measurement of any kind to be made with very little trouble. The shunts and volt-boxes made to accompany the potentiometer give it a very wide range, and in its latest form provision is made for easily testing its accuracy by comparing the resistance coils with the slide wire. With this instrument, a standard cell and a galvanometer, the electrical engineer has practically all he requires for accurate testing work.

An important memoir, by Sir George King, on the flora of the Malay Peninsula, is in course of publication in the *Journal* of the Asiatic Society of Bengal, the last fasciculus received in this country dealing with the begonias and allied groups.

The latest issue of Gegenbaur's *Morphologisches Jahrbuch* (vol. xxx. pts. i. and ii.) contains two papers on the anatomy of mammals. In the one, Herr G. Ruge continues his account of the variations of form in the liver of the Primates, dealing in this instance with the American monkeys; in the second, Herr J. Tandler discusses the development of the cranial arteries.

The Indian Forest Department has just issued the first fasciculus of a series of tracts dealing with insects affecting the forestry of the country under the title of "Departmental Notes." The part before us is by Mr. E. P. Stebbing, the lecturer to the school of the Department at Dehra Dun, and it is proposed in later numbers to give information with regard to both injurious and beneficial species. By this means it is hoped that the officers of the Department and others interested in forestry may be able to keep abreast of modern researches connected with the subject. Several of the insects referred to in this part are new to science. For the benefit of non-entomological readers, the descriptions might, we think, have been made a little less technical.

Among recent papers in the *Proceedings* of the Washington Academy is one by Prof. C. H. Eigenmann on the degenerate eyes of the blind, burrowing amphisbænian lizard *Rhineura floridina*. The case is especially interesting on account of the occurrence of a fossil representative of the same genus in the Miocene of Dakota. Unfortunately, nothing is known with regard to the eyes of the extinct form, but from the fact that all the living members of the group are blind, it seems practically certain that the degeneration of the eyes took place before the differentiation of the existing genera, in other words, at least as early as the lower Miocene. In the existing form, not only is the eye invisible externally, but there is no indication of the aperture by which it formerly opened on the surface.

Dr. W. Borchers and Mr. L. Stockem describe an apparatus for the electrolytic separation of calcium from the fused chloride in the *Zeitschrift für Elektrochemie* for October 2. The separation of the alkali earth metals is one of the most difficult of electrometallurgical problems, on account of the conflicting character of some of the necessary conditions. The form of furnace used in the present experiments consists of a circular carbon box serving as anode, which is supported on, but insulated from, a cooling arrangement; a thin iron rod in the centre of the box is used as kathode, and this is connected to the cooler. The floor of the box is covered with fluor-spar, on the top of which is the layer of molten calcium chloride. This arrangement allows the temperature to be so regulated that it is above the melting point of calcium chloride, but below that of calcium. The calcium separates in spongy form and can be removed by suitable tongs; if it is pressed together before it is taken out, so as to get rid of some of the chloride, a white metallic mass containing about 90 per cent. calcium can be obtained. A somewhat similar arrangement is described for the separation of strontium. The apparatus, the authors state, is suitable for lecture experiments and also for the preparation of the metal in large quantities.

The so-called foul brood of bees was first described under that name by Schirach in 1769, but it is supposed that so far back as Aristotle it was a recognised disease and that the remarks about it made by this writer undoubtedly refer to this particular malady. It was in 1885 that Messrs. Watson-Cheyne and Cheshire, with Koch's new bacteriological methods at their disposal, submitted this destructive disease to an elaborate scientific investigation, and shortly after presented to the scientific world a certain *Bacillus alvei* which was accepted as the *fons et origo* of the foul brood of bees. The subject has occupied much attention, not only of apiarists, but also of scientific men, and in 1900 Mr. Francis Harrison, of Ontario, published an important memoir dealing with methods of effectually combating the disease. The latest contribution to the scientific work on the subject emanates from the University of Liége, and the funds for carrying it on were provided by the Belgian Government. Dr. Lambotte, as the result of his extended researches, affirms that the *Bacillus alvei* of Cheyne and Cheshire is identical with the well-known and widely distributed *Bacillus mesentericus vulgaris*, and must be placed in the same category with, for example, the ubiquitous *B. coli communis*, which, although a normal and harmless inhabitant of the intestine, may under given conditions become pathogenic and give rise to disease. The endowment of harmless micro-organisms by suitable means with pathogenic properties is, of course, a well-recognised achievement, and Dr. Lambotte has shown experimentally how the familiar so-called potato-bacillus may artificially become invested with disease-producing powers and can engender foul-brood disease in bees.

The Department of Revenue and Agriculture of the Government of India has recently published the seventeenth issue of

"Agricultural Statistics of India for the years 1896-97 to 1900-01." The numerical data have been compiled under the supervision of the Director-General of Statistics and are issued in two parts, the first dealing with British India and the second with native States. The information is tabulated under fourteen headings, including, among others, tables showing the total area of districts; the amount of cultivated and culturable land; the gross cultivated area under each crop; agricultural stock; the principal varieties of tenure held direct from the Government; the progress made in the production of tea and of coffee; and the average yield per acre of the principal crops. The tables are accompanied by numerous short, explanatory notes which are often of an interesting nature. The following statistics referring to the cultivation and production of indigo in British India during the past few years show that a remarkable decline has occurred, doubtless in consequence of the competition of the artificial product:—

| Year. | Acres under cultivation. | Production in cwts. |
|---|---|---|
| 1897-1898 | 1,339,099 | 166,812 |
| 1898-1899 | 1,010,318 | 139,320 |
| 1899-1900 | 1,026,900 | 111,890 |
| 1900-1901 | 990,375 | 148,029 |
| 1901-1902 | 803,697 | 121,475 |

An important addition to the literature of the Myxomycetes will be found in the "Monograph of the Acrasieæ," by Mr. E. W. Olive. The paper, which is published in the *Proceedings* of the Boston Society of Natural History, provides a critical summary of the data furnished by previous writers and the results of the author's investigations. Mr. Olive follows Zopf in uniting the groups of the Labyrinthulæ and Acrasieæ under the title of the Sorophoreæ, which are related to, but more primitive than, the true Myxomycetes.

A new edition of the first volume of Mr. William Scott Taggart's "Cotton Spinning" has been published by Messrs. Macmillan and Co., Ltd. The book deals with all processes in cotton spinning up to the end of carding.

The lecture arrangements at the London Institution, Finsbury Circus, for the session 1902-3, have now been announced. The list includes lectures by Lord Avebury, on "The Scenery of England and the Causes to which it is Due"; by Sir Robert Ball, F.R.S., on "The Earth's Beginning"; by Dr. A. Smith Woodward, F.R.S., on "Some newly discovered Extinct Animals"; by Prof. S. P. Thompson, F.R.S., on "The Magic Mirror"; by the Rev. W. H. Dallinger, F.R.S., on "Recent Studies in the Lives of Spiders"; and by Dr. W. Hampson, on "Liquid Air." The lectures are held on Monday evenings at 5 o'clock and on Thursday evenings at 6 o'clock.

Messrs. Macmillan and Co., Ltd., have published a small collection of mathematical tables for ready reference compiled by Mr. Frank Castle and printed on stout paper. The booklet costs *2d.*, and contains useful numbers and formulæ, tables of logarithms and anti-logarithms, as in similar tables published by the Board of Education, together with tables of natural sines and tangents for every five minutes of arc. In view of the encouragement now being increasingly given to the use of logarithmic and trigonometric tables at an early stage of mathematical instruction in schools and colleges, the collection should prove of use to teachers and students alike.

An elaborate catalogue of balances and weights, containing more than one hundred pages and two hundred illustrations, has been published by Messrs. F. E. Becker and Co., of Hatton Wall, London. Balances and weights suitable for scientific work of every kind are described in the catalogue, and the prices at which they can be obtained are remarkably low in comparison with those of a few years ago. The quantitative work now carried on in the physical and chemical laboratories of schools has greatly increased the demand for students' balances sensitive to a milligramme or two, no less than six thousand of such balances having been introduced lately into Irish elementary schools. It is impossible to over-estimate the educational value of practice in the use of accurate balances, and by producing such instruments at reasonable prices firms like Messrs. Becker and Co. have done much to facilitate the introduction of such work into the school course.

The existence of a pentafluoride of iodine was indicated by Gore and by MacIvor thirty years ago. On account of its bearing on the question of the valency of iodine, a further examination of the behaviour of this fluoride seemed desirable, and in the current number of the *Comptes rendus* M. Henri Moissan gives an account of its preparation and properties. The compound is obtained without difficulty in a perfectly pure state by the action of fluorine upon solid iodine, and forms a colourless liquid, solidifying at 8° C. and boiling without change at 97° C. Analyses show that the fluoride has undoubtedly the composition $IF_5$, and it is noteworthy that it can be distilled in a current of hydrogen without any reaction taking place. This fluoride possesses very great chemical activity; most elementary bodies decompose it, and it produces with compound bodies a large number of double decompositions. Iodine pentafluoride is decomposed at about 500° C., iodine being formed, and possibly a new fluoride of iodine.

In the current number of the *Zeitschrift für physikalische Chemie* is an interesting paper by Mr. A. A. Blanchard on the decomposition of ammonium nitrite in aqueous solution by which reaction nitrogen is liberated. It is found that this decomposition only takes place with sufficient rapidity to enable the velocity to be determined under the influence of hydrogen ions or free nitrous acid. In these circumstances, the velocity with which nitrogen is evolved is proportional to the concentration of the ammonium ions and of the nitrite ions, being increased by the presence of other ammonium salts or nitrites, and the hydrogen ions have an accelerating effect on the reaction.

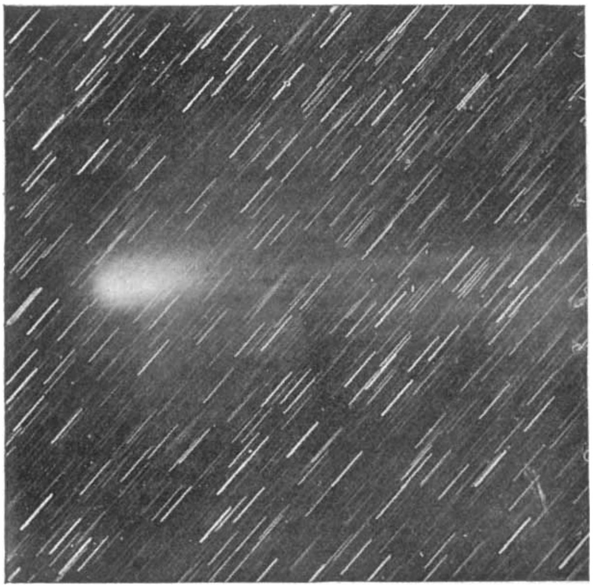
It has been known for some time that the compounds which the albuminoids form with acids and bases are of true salt-like character. The aqueous solutions of these compounds are conductors of electricity, and presumably, therefore, contain electrically charged ions. In the current number of the *Zeitschrift für physikalische Chemie*, Dr. Sackur gives an account of experiments which he has made on aqueous solutions of casein sodium. From the variation of the conductivity with the dilution, the author concludes that casein is a tetrabasic acid with a molecular weight equal to 4540. Experiments on the diffusibility of casein sodium indicate that, although an electrolyte, it is incapable of passing through parchment paper, and in this respect therefore behaves as a colloid.

In the *Journal* of the Chemical Society, Messrs. Chapman and Lidbury give an account of some interesting experiments on the decomposition of water vapour by the electric spark. A series of electric sparks was allowed to pass between two platinum wires sealed into a glass tube through which a current of water vapour was drawn. The gases from the anode and kathode sections of the tube were collected separately. As a result of the examination of the gases thus collected, the authors conclude that the separation of the constituent elements of water from water vapour is not entirely due to a process of electrolysis. If it were, hydrogen should appear at one electrode and oxygen at the other, whereas hydrogen collects at both electrodes. The quantities of the separated gases should, moreover, not exceed those of the oxygen and hydrogen, which collect in a voltameter placed in the same electrical circuit, whereas the experiments show that under certain conditions the quantity of hydrogen from the water vapour which collects at the kathode is five or six times as large as that which separates in the voltameter.

The additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*) from South Africa, presented by Captain R. Bolton; a Campbell's Monkey (*Cercopithecus campbelli*) from West Africa, presented by Mr. F. G. Lloyd; a Getulian Ground Squirrel (*Xerus getulus*) from Morocco, presented by Mr. Arthur Gill; a Cape Hyrax (*Hyrax capensis*) from South Africa, presented by Mr. A. C. Boddam Whetham; two Egyptian Jerboas (*Dipus oegyptius*) from North Africa, presented by Mr. G. Swales; a Spotted Eagle Owl (*Bubo maculosus*) from Africa, presented by Mr. C. H. Turner; a Horned Capuchin (*Cebus apella*), a Tayra (*Galictis barbara*) from South America, a Jelerang Squirel (*Sciurus bicolor*), a Larger Racket-tailed Drongo (*Dissemurus paradiseus*), two White-throated Ground Thrushes (*Geocichla cyanonotis*), an Indian Pitta (*Pitta brachyura*), an Indian Dial-bird (*Copsychus saularis*) from India, a Common Rat Kangaroo (*Potorus tridactylus*) from Australia, a Common Water-Buck (*Cobus ellipsiprymnus*) from South Africa, four Flat-backed Tortoises (*Testudo platynota*), a Phayre's Trionyx (*Trionyx phayrii*) from Burmah, two Eroded Cinixys (*Cinixys erosa*) from West Africa, two Bell's Cinixys (*Cinixys belliana*) from Tropical Africa, three Pennsylvanian Mud Terrapins (*Cinosternum pennsylvanicum*) from North America, deposited; an Amherst's Pheasant (*Thaumalea amherstioe*) from China, purchased.

## *OUR ASTRONOMICAL COLUMN.*

Comet *b*, 1902 (Perrine).—The photograph of this comet which accompanies this note was secured by Dr. Isaac Roberts on the evening of October 10. It was taken with his 20-inch reflector and received less than one hour's exposure, namely, 52 minutes. A great amount of detail is shown on the original positive from which this reproduction has been made, and it will be noticed that the comet has a multiple tail, two of comparatively large dimensions and several smaller streamers.



The rapidity with which the comet is travelling relatively to the stars can be gathered from the length of the star trails on the plate, the observer correcting the telescope for the comet's motion at short intervals.

A Bright Meteor.—Mr. W. Lascelles-Scott, of Little Ilford, Essex, states in the *Times* that at about 7.52 p.m. on October 15 he observed a bright meteor and noted the following particulars as to its path:—"General course and direction of the meteor, N.W. by N. towards S.W.; general angle of course to S.W. on horizontal plane, 30°; general length of course to S.W. about 105°; general shape of course, like an inclined and attenuated letter S; apparent diameter of meteor at *maximum*, about 1-25th of that of the moon, or 4 : 100; apparent brightness at *maximum*, about $\frac{1}{8}$th that of the moon, or 12 : 100; colour variations, from faint yellow, through blue to purplish at finish; apparent duration, about 3·8 sec. (nearly 4 sec.); coruscation, faint tripartite at finish."

Observations of Fifty-eight Long-Period Variables.—Part ii. of vol. xxvii. of the *Annals* of the Harvard College Observatory is devoted to the observations of fifty-eight long-period variables. The methods employed in making these observations were explained in part i. of this volume in reference to a similar research with regard to circumpolar long-period variables. Most of the stars are brighter than tenth magnitude, and these have been observed with the meridian photometer; those between the tenth and thirteenth magnitudes have been observed with the photometer attached to the 15-inch equatorial.

By taking a series of comparison stars in the immediate neighbourhood, observing their magnitudes in order of brightness and their differences in magnitude, and then plotting a smooth curve having for its abscissa these approximate brightnesses, and its ordinate the photometric magnitude, a very trustworthy value has been obtained for the magnitude of each variable.

A New Algol Variable.—In No. 3820 of the *Astronomische Nachrichten*, Mr. A. Stanley Williams announces the discovery that the star B.D. + 41°·504 is a variable of the Algol type. The position of this star is R.A. = 2h. 30m. 50s., Dec. = 41° 34′·3 (1855), and its normal magnitude 9·4. At minimum the star's brightness decreases to nearly twelfth magnitude.

Owing to the various observations being interrupted by clouds and by daylight, the instant of minimum has not been finally determined, but from the observations which have been made, the following elements and ephemeris have been found:—

Minimum of 14 1902 Persei = 1902 Sept. 16, 16h. 38m. G.M.T.
+ 3d. 1h. 21m. 32s.·23 E.
= J.D. 2416009·6934 + 3d.·056623 E.

*Ephemeris for every fifth minimum.*

| E. | Date. | G.M.T. | | E. | Date. | G.M.T. | |
|---|---|---|---|---|---|---|---|
| | | h. | m. | | | h. | m. |
| 207 | 1902 Oct. 17 | 6 | 14 | 247 | 1903 Feb. 16 | 12 | 35 |
| 212 | ,, Nov. 1 | 13 | 1 | 252 | ,, Mar. 3 | 19 | 23 |
| 217 | ,, ,, 16 | 19 | 49 | 257 | ,, ,, 19 | 2 | 11 |
| 222 | ,, Dec. 2 | 2 | 37 | 262 | ,, Apr. 3 | 8 | 58 |
| 227 | ,, ,, 17 | 9 | 25 | 267 | ,, ,, 18 | 15 | 46 |
| 232 | 1903 Jan. 1 | 16 | 12 | 272 | ,, May 3 | 22 | 34 |
| 237 | ,, ,, 16 | 23 | 0 | 277 | ,, ,, 19 | 5 | 21 |
| 242 | ,, Feb. 1 | 5 | 48 | | | | |

## *NOTES ON THE RECENT ERUPTIONS OF MONT PELÉE.*

*Dominica, September* 24.

*August* 17.—A steamer passing five miles to the west of Mont Pelée met a heavy ash cloud, which rendered the day as dark as night whilst the vessel passed through it. The deck was covered with ash.

*August* 18 *and* 19.—News reached here of further eruptions of Mont Pelée.

*August* 25.—Detonations heard during the day.

*August* 26.—Loud detonations and sounds like growlings were heard in the afternoon and evening. To the south-west of the island there were very heavy black ash clouds like a wall with a level top. The sun set behind this cloud as though a solid mass, all rays of light being cut off. During the whole day the upper atmosphere was charged with dust, but very little fell on this island.

*August* 28.—In the evening there was a magnificent display of lightning from Mont Pelée, and the sky in the direction of the volcano glowed with a pinkish light. At 11 p.m., lightning